Introductory Remarks

GridTool is an interactive software package developed at the NASA Langley GEOLAB by Dr. Jamshid Samareh. The tool was developed as a means to bridge the gap between Computer-Aided Design (CAD) and grid generation systems. Most grid generation systems represent geometry as a set of structured points. Typically, this type of representation is inconsistent with most CAD representations, which define curves and surfaces in terms of Non-Uniform Rational B-Splines (NURBS). In addition, the CAD geometry alone, is insufficient for generating a quality mesh, since grid spacing requirements must also be supplied to grid generators along with the geometry patch definitions.

GridTool merges CAD and grid generation by: 1) bringing accurate CAD geometry to the grid generators, 2) supplying the needed information regarding patch definition and spacing requirements to the grid generators, and 3) providing a highly interactive visualization tool for checking the fidelity and quality of complex CAD geometry.

Currently, GridTool supports both the *VGRID* [1] and *FELISA* [2] grid generation systems. Each creates unstructured tetrahedral meshes based on the advancing front method. The aim of this document is to teach the basic procedure for creating input decks for *VGRID* which is part of the *TetrUSS* [3] system. With minor modifications, most of these steps can also be applied to generating grids using *FELISA*. Throughout the remaining sections, the following notation is adopted: panel names are denoted by italics, buttons or clickable text by [ ] brackets, input fields by { } brackets, and window names by all capital letters.

Much of the information contained in this manual comes from the GridTool webpages and online documentation developed by Dr. Jamshid Samareh.